Incidence of Poliomyelitis

The Effect of Tonsillectomy and Other Operations on the Nose and Throat

ALDEN H. MILLER, M.D., Los Angeles

• *A statistical survey was made of all the cases of poliomyelitis occurring in all of Los Angeles County during the three years of 1949, 1950 and 1951 in an attempt to determine the effect of operations on the nose and throat on the incidence of poliomyelitis. Tonsillectomy and adenoidectomy were the only operations noted with any degree of frequency. Yet, in the total of 3,601 cases of poliomyelitis that occurred in this three-year period there were only 20 (0.55 per cent) in which the patient had had recent tonsillectomy and adenoidectomy.*

The incidence of this disease in patients who had had tonsillectomy and adenoidectomy was compared with the "expected" incidence as determined from the incidence in other patients, in the same age group. There was no significant difference between actual and expected incidence even during the summer months when most cases of poliomyelitis occurred. The same was true with regard to recently tonsillectomized patients in the epidemic months of July through October.

In a separate survey of 675 patients with poliomyelitis, it was noted that only 30 per cent ever had had tonsillectomy or adenoidectomy. Inasmuch as it is estimated that one of every three persons in the general young population nowadays has had tonsillectomy and adenoidectomy, this figure is no more or less than could be expected.

OPERATIONS ON THE NOSE and throat, especially tonsillectomy and adenoidectomy, have been accused of increasing the incidence of poliomyelitis. Since 1938 many articles have been written refuting or substantiating this contention. In 28 articles on the subject that were reviewed by Mills[2] late last year, opinions were about evenly divided as to whether or not poliomyelitis is more likely to occur in persons who have had tonsillectomy and adenoidectomy, either recently or in the more remote past. However, most of the investigators expressed belief that if poliomyelitis is contracted soon after tonsillectomy and adenoidectomy, there is increased likelihood that the disease will be of the bulbar type.

With the splendid cooperation of the Los Angeles County and the Los Angeles City health departments, a continuing three-year statistical study of complete data on all cases of poliomyelitis occurring in the entire county during the years 1949, 1950 and 1951 was carried out. Pertinent data from that study are presented here as a basis for conclusion as to whether or not operation on the nose and throat caused an increase in the incidence of poliomyelitis in Los Angeles County during those years.

In the entire county there were 1,229 cases of poliomyelitis in 1949, 984 in 1950 and 1,388 in 1951, or a total of 3,601. There was record of only three operations on the nose and throat other than tonsillectomy and adenoidectomy in the three-year period—one polypectomy, one removal of a biopsy specimen from the neck, and one excision of an external nasal cyst. (It is interesting that each year there were more dental extractions than tonsillectomies and adenoidectomies.)

The effect of recent tonsillectomy and adenoidectomy was studied first. Of the 1,229 cases of poliomyelitis in 1949[1] there were only five in which the patients had had the operation during the 30-day period preceding the onset of the disease. In 1950 eight of the total of 984 patients with poliomyelitis had had recent tonsillectomy, and in 1951 seven of 1,388. Not only is this total of 20 cases out of 3,601 (0.55 per cent) seemingly insignificant, but it is noteworthy that in 1951, the year in which the incidence of poliomyelitis was highest, there were fewer patients with recent tonsillectomy than there were in the year of the least incidence, 1950. If recent operation were a factor, the number of such cases in 1951 should have been about one-third greater than the number in 1950. Further, when the month of onset (Table 1) of these 20 cases was considered it was noted that fewer cases (nine) occurred during the months of highest poliomyelitis incidence, July through October, than during the months of lower incidence.

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TABLE 1.—Month of Onset of Poliomyelitis in Patients with Recent Tonsillectomy and Adenoidectomy

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1949	....	....	....	1	....	1	....	2	1	....	....	....
1950	....	....	....	....	1	2	1	1	1	....	2	....
1951	....	1	....	....	....	3	2	1	....	....	....	....
	1		1	1	6	3	4	2		2		

TABLE 2.—Incidence of Poliomyelitis in Children 2 to 8 Years of Age in Los Angeles City

	Number of Children in Age Group	Cases of Poliomyelitis in Age Group	Incidence of Poliomyelitis in Age Group
1949	239,369	177	1:1,352
1950	257,660	202	1:1,275
1951	264,914	265	1: 999

TABLE 3.—Expected and Actual Number of Cases of Poliomyelitis in Children 2 to 8 Years of Age with Adenotonsillectomy Done in Each of Years 1949, 1950 and 1951

	Estimated Total of Adenotonsillectomies Done in Los Angeles City	Incidence of Poliomyelitis in Age Group (From Table 2)	Incidence of Poliomyelitis in Patients with Adenotonsillectomy	
			Expected	Actual
1949	14,812	1:1,352	10.9	10
1950	14,586	1:1,275	11.5	8
1951	14,544	1: 999	14.5	10

TABLE 4.—Number of Cases of Poliomyelitis in Children 2 to 8 Years of Age, Los Angeles City, by Months

Month	1949	1950	1951	Total	Three Year Total Within Month After Tonsillectomy and Adenoidectomy
Jan.	18	6	26	50	0
Feb.	4	2	10	16	1
Mar.	7	8	2	17	0
April	3	13	14	30	1
May	14	13	8	35	1
June	26	24	28	78	6
July	70	52	91	213	3
Aug.	75	66	131	272	4
Sept.	97	61	126	284	2
Oct.	62	48	97	207	0
Nov.	45	64	54	163	2
Dec.	21	36	28	85	0

In the last two columns in Table 3 the actual incidence of poliomyelitis in patients who had had adenotonsillectomy done in each of the three years can be compared with the expected incidence of poliomyelitis in the same number of children in the two to eight year age group, and it is noted there is no significant variation.

Another step in the investigation was to determine the expected and the actual incidence of poliomyelitis in the child population of Los Angeles City in the age group of two to eight years inclusive, the years in which almost all tonsillectomies and adenoidectomies are performed (see Tables 2 and 3). As in 1949,[1] reasonably accurate information on this age group was obtained. The Board of Education and the Bureau of Vital Statistics supplied population figures, and data on operations were obtained in replies to questionnaires sent to large hospitals in the city.

In a three-year period in Los Angeles City fewer cases of poliomyelitis followed recent tonsillectomy and adenoidectomy during the four months of highest incidence of the disease, July through October, than during the remainder of the year (Table 4). The highest total for any one month was that for June—six cases. Yet the operations in those cases were done in May or June, which were months in which the incidence of poliomyelitis was relatively low. This does not seem consistent with the theory that increased presence of the virus in the nasopharynx at the time of operation leads to increased incidence of the disease.

Inasmuch as the highest incidence of poliomyelitis occurs during the summer months, and because those are the months in which the fewest tonsillectomies are done (owing to the controversy discussed herein), data were compiled on expectancy and on the actual number of cases of poliomyelitis occurring in children two to eight years of age in various spans of time—periods of 10 months, 8 months, 6 months and 4 months—in which the incidence of poliomyelitis is seasonally highest (Table 5).

In Table 5 it will be noted that there was no statistically significant variation between the expected

TABLE 5.—Application of the Chi-Squared Formula to Variation Between Expected and Actual Number of Cases of Poliomyelitis Among Patients 2 to 8 Years of Age Who Had Had Tonsillectomy and Adenoidectomy in Same Year

Period	Expected			Actual			Chi-Square		
	1949	1950	1951	1949	1950	1951	1949	1950	1951
Entire year	10.9	11.5	14.5	10	8	10	0.07	1.07	1.39
Feb. to Nov.	9.3	9.2	11.8	10	8	10	0.05	0.16	0.27
April to Nov.	6.8	7.1	8.5	10	8	9	1.52	0.11	0.03
May to Oct.	4.3	5	5.8	8	6	9	3.18	0.20	1.76
July to Oct.	1.7	2.5	2.0	7*	4	8*	19.11	0.90	18.00
July to Oct. (operation within 30 days of onset)	1.7	2.5	2.0	1.5	2	2	0.02	0.10	0.00

* Statistically significant deviation from expectation. Deviation of same order was not present, however, when only cases in which operation had been done within 30 days of onset were considered.

and actual cases except in the four-month period of July through October of 1949 and 1951 (but not of 1950). It is to be noted, however, that the subjects were persons who had had tonsillectomy and adenoidectomy *at any time* in the year in which they had poliomyelitis, not alone those who had been operated upon within one month of onset. When only those who had had tonsillectomy and adenoidectomy within thirty days of onset were considered, there was no significant deviation between the expected and the actual number of cases even in the months when the incidence of poliomyelitis was highest and the number of operations lowest.

In 1951 an additional study was done on the 675 cases of poliomyelitis occurring in Los Angeles County exclusive of Los Angeles City to determine how many of the patients ever had had tonsillectomy and adenoidectomy. Only 206 (30 per cent) of them had had the operation and 469 (70 per cent) had not. At first blush this fact might be considered to indicate that persons who had not had the operation were considerably more likely to contract poliomyelitis than were those who had had it. However, as numerous observers have estimated that only about one-third of the general young population has had tonsillectomy, it should be expected that ordinarily some 33 per cent of persons contracting poliomyelitis have had the operation. The figure of 30 per cent in this series, then, was about in line with expectation.

It was therefore concluded that operations on the nose and throat, including tonsillectomy and adenoidectomy, either recent or done long before, had no significant effect, statistically, on the incidence of poliomyelitis in Los Angeles County during the three-year period 1949-1951.

500 South Lucas Avenue.

REFERENCES

1. Miller, A. H.: Tonsillectomy and adenoidectomy and poliomyelitis, A.M.A. Arch. of Otol., 53:150-166, Feb. 1951.

2. Mills, C. K.: The tonsillectomy-poliomyelitis problem, Laryng., 56:1188-94, Dec. 1951.

As clinical observers, we study the experiments which Nature makes upon our fellow-creatures. These experiments, however, in striking contrast to those of the laboratory, lack exactness, possessing as they do a variability at once a despair and a delight—the despair of those who look for nothing but fixed laws in an art which is still deep in the sloughs of Empiricism; the delight of those who find in it an expression of a universal law transcending, even scorning, the petty accuracy of test-tube and balance, the law that in man, "the measure of all things," mutability, variability, mobility, are the very marrow of his being.

—WILLIAM OSLER, in his address to the Army Medical School, Washington, February 28, 1894.